

## **Chapter 6—Threats**

### **Threat Prioritization**

#### **National, International and Global Threats**

#### **Threat Tables**

Table 9. Threats to terrestrial habitats

Table 10. Threats to aquatic habitats

#### **The Top Five Threats**

**Terrestrial Habitats**

**Aquatic Habitats**

#### **Additional Priority Threats**

## **Chapter 6—Threats**

### **Threat Prioritization**

This chapter outlines the major threats to the District's species of greatest conservation needs and their habitats. The District's species of greatest conservation need and their habitats face considerable threats and they are all important. However, it would be virtually impossible to address them all in a 10-year strategy. Furthermore, some threats are not feasible to mitigate due to the District's size and urban character. Thus, it was necessary to prioritize the threats and to target the top five highest-ranking threats. Threats were ranked by expert opinion, as described in Chapter 3.

The development phase of the CWCS included a threat selection and prioritization process. The implementation phase will include a threat reassessment and reprioritization process. As conservation actions are implemented, the status and trends of species, habitats, and threats are expected to change. These changes will be measured by the District's monitoring plan (Chapter 10). Furthermore, conservation technologies will improve, and the District's approach to conservation will have to adapt to remain effective. Therefore, the District has a plan to reassess and reprioritize threats and subsequently revise the CWCS. For example, a revised CWCS may prioritize a threat that is currently ranked low on the table. This process will include the entire Working Group, with the collaboration of monitoring data from the DC Fisheries and Wildlife Division, the National Park Service, the US Geological Survey, the National Arboretum, the US Fish and Wildlife Service, MD Department of Natural Resources, and many others.

### **National, International and Global Threats**

#### **Global**

The conservation of many of the District's species of greatest conservation need is unfortunately outside the scope of the District's conservation actions alone. These species face threats that are outside of the District's sphere of influence because the threats originate outside of the District. These threats are regional, national, international, or even global in character. One overarching global threat may be climate change. Climate change can lead to increased precipitation in some regions and more arid conditions in others. More precipitation can lead to increased erosion and sedimentation and thus adversely affect priority habitats such as submerged aquatic vegetation in the District as well as species of greatest conservation need that are dependent on them such as alewife, blueback herring, American shad and hickory shad. It could also lead to erosion which could scour out potential spawning areas for Atlantic and shortnosed sturgeon. A decrease in precipitation could be just as disastrous for certain species as an increase is for others. If drought conditions caused certain springs and seeps to dry-up then the only available habitat for species such as the Hay's Spring amphipod could be lost. Whether caused by too much or too little rain, any additional loss of habitat for

populations which are already stressed could prevent them from recovering. Conservation actions should attempt to address all scales of threats whenever possible.

## **International**

Certain international threats can be more easily addressed than others because the origin of the threat can be identified, as in the case of rainforest destruction. While rainforests may not at first appear important to species in our area, several species migrate to these regions during the winter and return to the District during spring migration. Since certain countries such as Brazil are known to be suffering from deforestation, international conservation actions could be directed at these specific locations. While it may be in a countries' immediate financial interest to allow the destruction of its rainforest, through fostering worldwide environmental stewardship, and implementing environmentally friendly ecotourism types of activities, it could be possible to prevent some of the rainforest loss and thus help the District's species of greatest conservation need. While international cooperation is not always easy, long term partnerships could pay off with truly rewarding outcomes.

## **National**

Another group of migratory species affected by threats originating outside of the District are fish. Migratory species are very difficult to manage during the parts of their lives that they are spending outside of the District. They are living in a different habitat under a different jurisdiction. Attempting to partner with these jurisdictions is a strategy of this CWCS. Species of greatest conservation need, including alewife, blueback herring, hickory shad, American shad, Atlantic sturgeon and shortnosed sturgeon are all vulnerable to fishing pressure, both targeted and as bycatch, when they are out of District jurisdiction. While the District has no commercial fishery, since these species are migratory and move in and out of different jurisdictional waters, they do encounter commercial fishing pressure as well as additional recreational pressure. In addition to the legal catch the commercial and recreational fisheries provide, there is also bycatch mortality and a poaching threat to each fishery. Taken together, the threats faced by these species when they are outside of the District are probably greater than those faced when they are within the District's jurisdictional waters.

## Threat Tables

The following tables (Tables 8 & 9) show the threats in order of priority divided by habitat. The score on the right column represents the overall rank of each threat for terrestrial and aquatic habitats. Following the tables, the top five overall highest priority threats for terrestrial and aquatic habitats are described in detail. Then, there are descriptions for threats for which this CWCS targets conservation actions.

**Table 9. Threats to terrestrial habitats**

3— high threat

2— medium threat

1— low threat

(blank)— not a threat to each habitat

Threat	Habitat Type				Priority Rank
	Hardwood Forest	Early successional/ Shrub-scrub/ Edge	Grasslands/ Managed meadows	Urban Landscapes	
<b>Invasive/ alien species</b>	3	2.9	2.4	1.8	<b>2.5</b>
<b>Recreation</b>	2.3		1.7	2.4	<b>1.6</b>
<b>Fragmentation</b>	2.5	2.1	1.7		<b>1.6</b>
<b>Dumping</b>	2.1	2.1	1	0.8	<b>1.5</b>
<b>Contaminants</b>	1	1.6	1.3	2.2	<b>1.5</b>
<b>Noise pollution</b>	1.9	1.9	1.3	1	<b>1.5</b>
<b>Habitat loss</b>	1.6	1.8	2		<b>1.4</b>
<b>Parasites/ pathogens</b>	1.5	1.4	0.1	2	<b>1.3</b>
<b>Overbrowsing</b>	1.8	1.1	0.8	1	<b>1.2</b>
<b>Stormwater erosion</b>	2			2	<b>1</b>
<b>Air pollution</b>	1		1	2	<b>1</b>
<b>Poaching</b>	0.4	1	0.8	1.4	<b>0.9</b>
<b>Roads/ utility corridors</b>			1.3	2.2	<b>0.9</b>
<b>Park facilities/ operations/ maintenance</b>			1.8	1.6	<b>0.9</b>
<b>Erosion</b>	0.4	1		1.8	<b>0.8</b>
<b>Light pollution</b>		0.5	0.2	2.2	<b>0.7</b>
<b>Development</b>		2			<b>0.5</b>
<b>Change in land use/ ownership</b>			1.4		<b>0.4</b>

**Table 10. Threats to aquatic habitats**

3— high threat

2— medium threat

1— low threat

(blank)—not a threat to each habitat

Threat	Habitat Type									Priority Rank
	Rivers & streams	Emergent Non-tidal Wetlands	For wetlands, Riparian, Floodplain	Emergent Tidal Wetlands	Tidal Mudflats	Springs & seeps	SAV	Vernal Pools	Ponds & pools	
Invasive/ alien species	2.3	2.9	3	2.5	2.8	2	2.2		1.5	<b>2.1</b>
Sedimentation	3	2.1	0.9	2.8	2.6	3	2.1	1.1	1.5	<b>2.1</b>
Changes to hydrologic regimes	3	2.1	1.8	1.5	2	2	1.1	2.7	1.5	<b>2</b>
Stormwater erosion	3	1.9	2.2	1.8	2.2	2	2.4		1.6	<b>1.9</b>
Pollution	2.5	2.1		2.7	2.6	2	2.1	1.4	1.8	<b>1.9</b>
Erosion	2.9	2		1.3	1.8	1			1.6	<b>1.2</b>
Habitat loss		2.1	1.6	1.8		1	2.6			<b>1</b>
Overbrowsing		0.8	1.5	2			1.3		1.4	<b>0.9</b>
Parasites/ pathogens		0.5	1.4	1.5		1	1.6		1.1	<b>0.8</b>
Poaching	1.6	0.4	1.2	0.7		1		1.1	0.4	<b>0.7</b>
Recreation	1		1.6				1	1		<b>0.6</b>
Hardened shorelines	1.9	0.5		1.3						<b>0.5</b>
Contaminants			1.5			3				<b>0.5</b>
Park facilities/ operation/ maintenance			1.5			2		1.3		<b>0.4</b>
Change in land use/ ownership			1.9				1.6			<b>0.4</b>
Fragmentation			2.4			1				<b>0.4</b>
Migration barriers	1.4							0.9		<b>0.3</b>
Piped streams/ channelization	2.4									<b>0.3</b>
Private property encroachment			2							<b>0.3</b>
Roads/ utility corridors			1.6			1				<b>0.3</b>
Dumping			1.2			1				<b>0.2</b>
Noise pollution			1.9							<b>0.2</b>
Air pollution			1.4							<b>0.2</b>
Overharvesting	1.3									<b>0.2</b>
Light pollution			1.3							<b>0.2</b>

## The Top Five Threats

### Terrestrial Habitats

1. Invasive and alien species— Invasive species are species that are not native to the area and are likely to threaten the native biodiversity of the habitat. Invasive and alien species could have been brought to habitats either intentionally or unintentionally by human disruptions of natural processes or by lack of management. Habitats can also be susceptible to invasive and alien species if they are suffering other stresses, such as nutrient loading, hydrological change, or soil compaction. They become established in habitats because they lack the predators and diseases that kept them at stable populations in their native environments.<sup>65</sup>

Invasive and alien plant and animal species are the overall biggest threat across both terrestrial and aquatic habitat types within the District. Invasive and alien species can include both plant and animal species. An example of an invasive plant species is lesser celandine, *Ranunculus ficaria*, which is a threat targeted by this CWCS. Examples of invasive animal species are rats and raccoons. They have become invasive due to reasons associated with human development, resulting in increased predation on some of the District's species of greatest conservation need. Populations of these predators have reached historic highs and have reduced productivity for many species across all habitat types.

While the threat of invasive and alien species is not unique to the District, the District does have a unique dilemma. Because all wildlife species are protected by District regulation, wildlife agencies are extremely limited in management actions for animal invasive and alien species.<sup>66</sup> For example, there are few options for managing the destructive overpopulation of resident Canada Geese, as discussed earlier.

2. Recreation— The demand for outdoor recreation amongst the urban setting has led recreationalists to the only remaining natural areas in the District. The DC Office of Planning says that much of the District's parkland is inaccessible to the public, resulting in high pressure on the parks that are accessible.<sup>67</sup> For example, Rock Creek Park contains some of the largest unfragmented natural areas in and around the District, so it is expectedly inundated with recreationalists. It is also home to the spotted salamander, which is a species of greatest conservation need. The salamander requires vernal pools during the spring for breeding success and Rock Creek Park is a priority location for vernal pools. However, the pools are disturbed and damaged by recreational activities and pets off leash. Despite signs

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<sup>65</sup> Chicago Region Biodiversity Council. *Biodiversity Recovery Plan*. Chicago: Chicago Region Biodiversity Council, 1999, p. 65.

<sup>66</sup> Water Pollution Control Act of 1984, p. 2032-3.

<sup>67</sup> DC Office of Planning. Environmental Quality, the Washington, DC Comprehensive Plan. Washington, DC: DC Office of Planning, 2005.

and other enforcement efforts taken by the park, the salamander continues to be threatened by recreation. While recreation is not one of the top five highest ranking threats for vernal pools, it is a strategy of this CWCS to prevent recreation from becoming a bigger threat to this habitat and the species of greatest conservation need that are dependent upon it.

3. Fragmentation— Fragmentation is caused by many forms of human development, such as roads and residences. Much of the original forest in the District has been developed and fragmented. When habitats are fragmented, gene flow alters, predation increases, and opportunities for invasive species increases. Fragmentation is a significant threat to animal species that require large, contiguous habitat blocks, such as grassland and forests species. Often, these species need these habitat blocks to breed or forage successfully. Less obvious forms of fragmentation, such as power lines through forests, may fragment habitat for insects and other invertebrate species.<sup>68</sup> As such, almost all of the District's terrestrial species of greatest conservation need are impacted by fragmentation.

This makes managing land use changes while simultaneously preserving the environment one of the greatest conservation challenges. Because of the high rate of urbanization, the District has a large responsibility for conserving the species that are impacted by urbanization.

4. Dumping— Dumping is a threat to all terrestrial habitats, as well as for forested wetlands/ riparian woodlands/ floodplains and springs and seeps.
5. Contaminants— Although the District was never a major industrial center, it still has brownfields, or areas that are, or are perceived to be, polluted from past activities. Contamination on these sites impacts wildlife and their habitats and needs to be addressed before new uses can be developed.<sup>69</sup>

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<sup>68</sup> Chicago Region Biodiversity Council. *Biodiversity Recovery Plan*. Chicago: Chicago Region Biodiversity Council, 1999, p. 64.

<sup>69</sup> DC Office of Planning. Environmental Quality, the Washington, DC Comprehensive Plan. Washington, DC: DC Office of Planning, 2005.

## Aquatic Habitats

1. Invasive and alien species— See Terrestrial Habitats
2. Sedimentation— Sedimentation in the District is mainly a function of activities occurring in jurisdictions bordering the Potomac and Anacostia Rivers outside of the District. Due to land disturbance caused by housing and road construction, changes in the hydrologic regime caused by development, and the concurrent increase in impervious surfaces, stormwater runoff during rain events move large quantities of soil from land surfaces into the waterways. Once the rivers begin to widen and slow in the District, the sediment which had been transported downstream with the swift upstream currents begins to settle out as sediment. Sedimentation is also caused by water moving soil from disturbed sites in the District.
3. Changes to hydrologic regimes— Changes to hydrologic regimes have a number of sources. Urban development with associated draining, paving, topography changes, and other changes in land use can either increase or decrease the quantity of water flow. Converting forests to lawns, roadways, driveways or rooftops changes the hydrologic regime by removing the effect of water uptake and transpiration by the trees. The water not normally taken up and transpired by the trees then has to go somewhere and may flow overland and directly into a receiving waterbody. Changing hydrologic regimes in the District are generally leading to reduced recharging of the aquifers and more runoff directly into creeks, streams and rivers. The runoff also tends to lead to increased rates of erosion, increased pollutant loads, and sedimentation.

Low-lying habitats, such as emergent non-tidal wetlands, emergent tidal wetlands, tidal mudflats, springs and seeps are impacted by changes in hydrologic regimes when their associated upland habitats are developed.<sup>70</sup> Riparian woodlands are impacted by changes in hydrologic regimes when the channelization of streams lowers the water table. This eliminates the connection between streams and riparian woodlands, except during floods. This, in turn, increases sedimentation in floodplain forests due to floods.<sup>71</sup>

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<sup>70</sup> Chicago Region Biodiversity Council. *Biodiversity Recovery Plan*. Chicago: Chicago Region Biodiversity Council, 1999, p. 63.

<sup>71</sup> Chicago Region Biodiversity Council. *Biodiversity Recovery Plan*. Chicago: Chicago Region Biodiversity Council, 1999, p. 64.



Stormwater erosion— Increases in stormwater erosion occur concurrently with increases in impervious surfaces and changes in land use which occur during development. Due to the highly developed character of the District, stormwater has a tendency to produce a lot of erosion even in naturally vegetated areas. When stormwater is unregulated, or improperly directed to a receiving pond, it leads to sedimentation, the transport of pollutants, and dramatic changes in water temperature in the District's creeks, streams and rivers into which the water flows. Stormwater erosion thus leads to a degradation of those habitats into which it is deposited.

5. Pollution— Pollution can enter a habitat in a variety of ways ranging from urban runoff to air pollution. Nutrient loading can create conditions in which native plants cannot compete with invasive and alien species. Airborne pollutants, such as nitrogen and carbon dioxide, can contribute to this excess nutrient loading.<sup>72</sup>

The District, as an urban center, is especially vulnerable to both point and non-point source water pollution. Point source pollution includes municipal wastewater and stormwater discharges. For example, millions of gallons of raw sewage are released into the Anacostia River every year.<sup>73</sup> Non-point source pollution results from vast urban development and road construction. For example, urban development in the District and upstream in Maryland brings pollutants from buildings and streets into the Anacostia River.<sup>74</sup>

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<sup>72</sup> Chicago Region Biodiversity Council. *Biodiversity Recovery Plan*. Chicago: Chicago Region Biodiversity Council, 1999, p. 65.

<sup>73</sup> DC Office of Planning. Environmental Quality, the Washington, DC Comprehensive Plan. Washington, DC: DC Office of Planning, 2005.

<sup>74</sup> DC Office of Planning. Environmental Quality, the Washington, DC Comprehensive Plan. Washington, DC: DC Office of Planning, 2005.

## **Additional Threats Prioritized**

### **Terrestrial**

1. **Stormwater erosion of hardwood forests.** Hardwood forests in the District are susceptible to stormwater erosion from urban area storm/sewer pipe outflows that empty into the streams or creeks running through such habitat. During periods of heavy rainfall, such outflows may have sufficient volume and may generate the requisite erosive force to wash away stream-side vegetation.
2. **Habitat Loss of hardwood forests.** Hardwood forests in the District face constant threat from the myriad effects of ever-increasing urbanization. Loss and degradation of such habitat from development projects such as roads, power lines, etc. is an ongoing process. The insidious effects on hardwood forest ecology of over-browsing by a burgeoning Whitetail Deer population, is another significant management issue.
3. **Park facilities/operations, maintenance in grasslands/ managed meadows.** Laying of roads and trails and other infrastructure by park and municipal managers are a source of stress on grasslands/ managed meadows as well as urban landscapes. Mowing of grasslands and meadows at inappropriate times can alter critical habitat for associated species.
4. **Development on early successional/ shrub-scrub/ edge habitat.** The laying of trails and roads, as well as construction of infrastructure (e.g. buildings) is a constant threat to early successional/ shrub-scrub/ edge habitat within the District. Such habitat has a tendency to not get the same level of concern and respect by the layperson as some other habitat types, e.g. hardwood forest.
5. **Noise pollution in early successional/ shrub-scrub/ edge habitat.** Noise can be very disruptive to behavior patterns of animals that are required for their reproduction and survival. Little is known of the potential effects of sources of constant and substantial noise pollution on terrestrial species within metro areas. Basic research is needed to better understand the precise nature of the effects of this pervasive phenomenon within urban DC.
6. **Light pollution in urban landscapes.** The excessive use of street illumination and other sources of light throughout much of the urban landscapes of the District have the potential of being a source of disturbance for nocturnal species. Bright lights from tall buildings within the DC metro area are a source for mortality for bird species during migration seasons. Brightly lit buildings tend to disorient migrating birds thus causing them to collide into such structures.
7. **Roads/ utility corridors through urban landscapes.** See #1.

8. **Parasities/ pathogens in urban landscapes.** Parasites and pathogens have the potential for seriously impacting resident populations of a range of species within the District. Recent outbreaks of the West Nile virus have severely depleted bird populations within the metro area. Rabies and canine distemper are an ever-present threat for some of the District's priority bat and canid species.
9. **Poaching (terrestrial & aquatic) vs. Overharvesting (aquatic).** Poaching is an illegal form of removing wildlife. Overharvesting occurs when the removal of the species is not illegal, but is ecologically unsustainable.

## **Aquatic**

1. **Erosion of Rivers & Streams** is caused both by high flows, typically caused by heavy rains, in the spring falling on frozen ground incapable of absorbing the precipitation, and in the summer and fall associated with passing hurricanes or other large scale meteorological events. It can also occur in the winter, caused by the scouring of river and stream bottoms and banks by ice flows. This type of erosion is believed to be partially responsible for the loss of submerged aquatic vegetation in the District.
2. **Habitat loss of Emergent Non-tidal Wetlands** is associated with both natural sedimentation and developmentally induced filling-in. Since land for development is at such a premium in the District, developers have great incentives to try and make these areas suitable for development.
3. **Overbrowsing of Emergent Tidal Wetlands** is a threat most closely linked to resident Canada geese. The overly abundant resident geese enter these wetlands to feed, but due their numbers, end up destroying the habitat.
4. **Contaminants Entering Springs and Seeps** are associated with both overland flow into these habitats as well as groundwater contamination. Contaminants include airborne pollutants, and terrestrial pollutants such as runoff from roadways, and manicured and maintained lawns and gardens.
5. **Park Facilities, Operations and Maintenance Effects on Springs and Seeps** include activities as innocuous as vehicular traffic in-and-out of maintenance facilities, and maintenance of parkland. These operations allow for additional air-borne and terrestrial contamination to occur due to the close proximity of facilities to these habitats.
6. **Habitat Loss of Submerged Aquatic Vegetation** is caused by poor water quality and physical erosion and scouring. High turbidity, often caused by wind and wave induced erosion in aquatic systems, and overland stormwater erosion in terrestrial environments, prohibits light penetration needed for vegetative growth. Physical erosion and scouring of stream and river bottoms by either high flows or

ice can cause the uprooting of established plants. All of these processes are negatively affecting our submerged aquatic vegetation habitats in the District.

7. **Park Facilities, Operations and Maintenance Effects on Vernal Pools** include activities as innocuous as vehicular traffic in-and-out of maintenance facilities, and maintenance of parkland. These operations allow for additional air-born and terrestrial contamination to occur due to the close proximity of facilities to these habitats.
8. **Poaching in Vernal Pools** is associated with people visiting these habitats and removing organisms, either for display in their own homes or for sale in retail businesses.
9. **Erosion of Ponds & Pools** is generally caused by wind induced wave action cutting at shorelines and to some extent the shallow bottom areas. Erosion in these habitats can lead to a decrease in water quality by increasing the suspended solids found in these waters. The increased suspended solids in turn cuts down on the amount of light capable of sustaining aquatic vegetation.